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Use of Sentiel-2 Data to Monitor Plant Density and Establishment Rate of Winter Wheat Fields

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Abstract : Plant counting is a labour intensive and time-consuming task for the farmers. However, it is an important indicator for farmers to make decisions on subsequent field management. This study is to evaluate the potential of Sentinel-2 images using statistical analysis to retrieve information on plant density for monitoring, especially during critical period at the beginning of March. The model was calibrated with in-situ data from 19 winter wheat fields in Republic of Ireland during the crop growing season in 2019-2020. The model for plant density resulted in R2 = 0.77, RMSECV = 103 and NRMSE = 14%. This study has shown the potential of using Sentinel-2 to estimate plant density and quantify plant establishment to effectively monitor crop progress and to ensure proper field management.

Keywords : winter wheat, remote sensing, crop monitoring, multivariate analysis
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